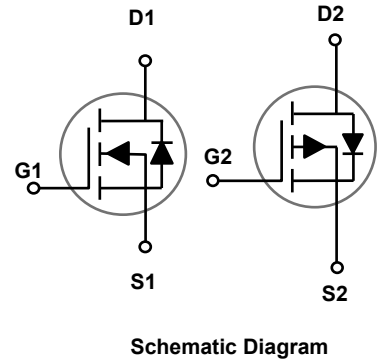
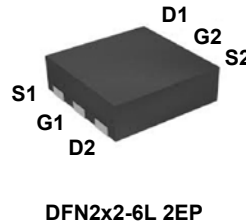


Main Product Characteristics

Polarity	N-Ch	P-Ch
$V_{(BR)DSS}$	20V	-20V
$R_{DS(ON)}$	24m Ω (Max.)	38m Ω (Max.)
I_D	5.5A	-5.0A



Features and Benefits

- Advanced MOSFET process technology
- Ideal for high efficiency switched mode power supplies
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



Description

The GSFB3916K utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supplies and a wide variety of other applications.

Absolute Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Max.		Unit
Drain-Source Voltage	V_{DS}	20	-20	V
Gate-to-Source Voltage	V_{GS}	± 10	± 10	V
Continuous Drain Current, @ Steady-State ($T_C=25^\circ\text{C}$)	I_D	5.5	-5.0	A
Continuous Drain Current, @ Steady-State ($T_C=100^\circ\text{C}$)		3.5	-3.1	A
Pulsed Drain Current @ $T_C=25^\circ\text{C}^1$	I_{DM}	22	-20	A
Power Dissipation @ $T_C=25^\circ\text{C}^2$	P_D	0.64	0.61	W
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	80	80	$^\circ\text{C/W}$
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	-55 to +150	$^\circ\text{C}$
Soldering Temperature (SMD)	T_{sld}	260	260	$^\circ\text{C}$

N-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	20	-	-	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA	-	0.02	-	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V, T _J =25°C	-	-	1	μA
		V _{DS} =16V, V _{GS} =0V, T _J =125°C	-	-	10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	-	±10	μA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =3A	-	16	24	mΩ
		V _{GS} =2.5V, I _D =2A	-	20	34	
		V _{GS} =1.8V, I _D =1A	-	35	42	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250μA	0.5	0.7	1	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		-	-2	-	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =5V, I _S =5A	-	14	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q _g	V _{DS} =10V, I _D =5A, V _{GS} =4.5V	-	9.2	-	nC
Gate-Source Charge ^{2,3}	Q _{gs}		-	1.6	-	
Gate-Drain Charge ^{2,3}	Q _{gd}		-	2.1	-	
Turn-On Delay Time ^{2,3}	t _{d(on)}	V _{DD} =10V, R _G =3Ω, V _{GS} =4.5V, I _D =5A	-	11	-	nS
Rise Time ^{2,3}	t _r		-	34	-	
Turn-Off Delay Time ^{2,3}	t _{d(off)}		-	54	-	
Fall Time ^{2,3}	t _f		-	52	-	
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, F=1MHz	-	670	-	pF
Output Capacitance	C _{oss}		-	150	-	
Reverse Transfer Capacitance	C _{rss}		-	90	-	
Drain-Source Ratings and Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	5.5	A
Pulsed Source Current	I _{SM}		-	-	26	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C	-	-	1.2	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%.
3. Essentially independent of operation temperature.

N-Channel Typical Electrical and Thermal Characteristic Curves

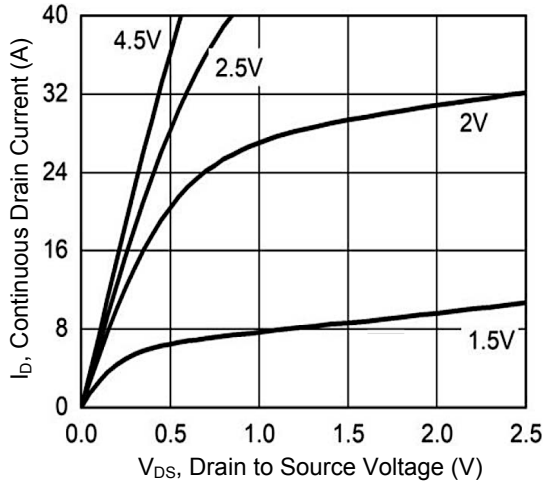


Figure 1. Output Characteristics

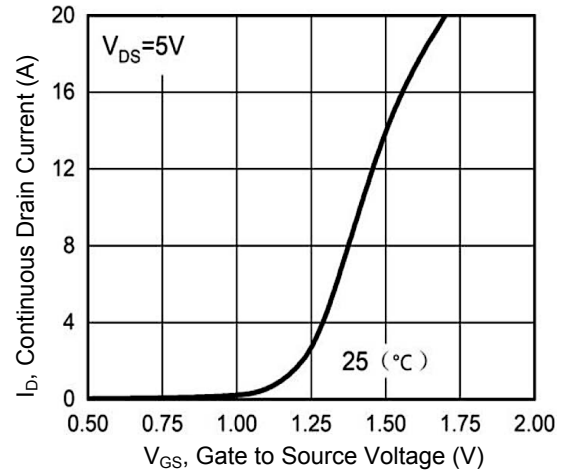


Figure 2. Transfer Characteristics

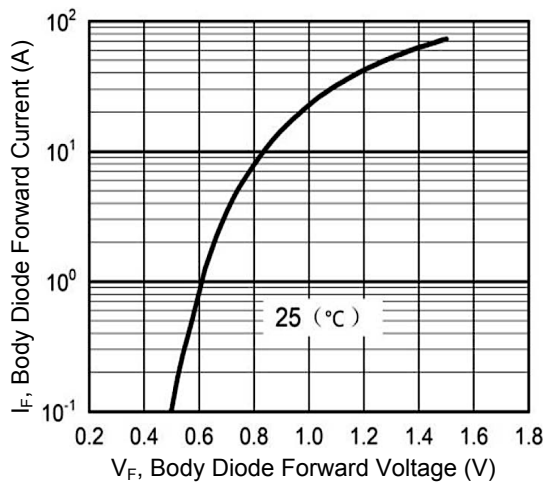


Figure 3. Body Diode Characteristics

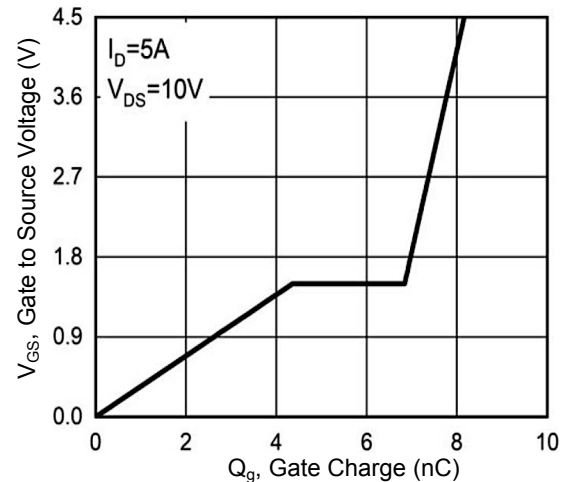


Figure 4. Gate Charge Waveform

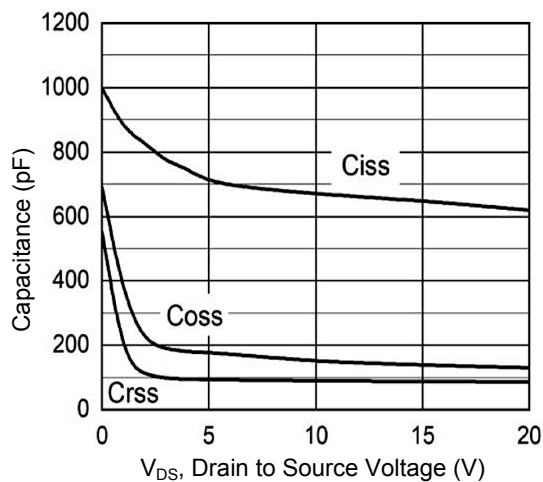


Figure 5. Capacitance Characteristics

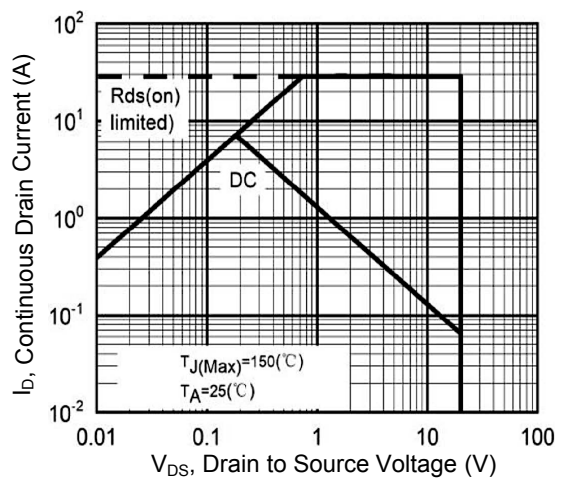


Figure 6. Maximum Safe Operation Area

P-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250μA	-20	-	-	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA	-	-0.02	-	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	-	-	-1	μA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C	-	-	-10	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±10V, V _{DS} =0V	-	-	±10	μA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-4A	-	25	38	mΩ
		V _{GS} =-2.5V, I _D =-4A	-	34	51	
		V _{GS} =-1.8V, I _D =-2A	-	52	69	
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250μA	-0.55	-0.75	-1	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		-	-2	-	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =-5V, I _S =-5A	-	14	-	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2,3}	Q _g	V _{DS} =-10V, I _D =-5A, V _{GS} =-4.5V	-	9.1	-	nC
Gate-Source Charge ^{2,3}	Q _{gs}		-	1.48	-	
Gate-Drain Charge ^{2,3}	Q _{gd}		-	1.48	-	
Turn-On Delay Time ^{2,3}	t _{d(on)}	V _{DD} =-10V, R _G =3Ω, V _{GS} =-4.5V, I _D =-5A	-	11	-	nS
Rise Time ^{2,3}	t _r		-	34	-	
Turn-Off Delay Time ^{2,3}	t _{d(off)}		-	30	-	
Fall Time ^{2,3}	t _f		-	10	-	
Input Capacitance	C _{iss}	V _{DS} =-10V, V _{GS} =0V, F=1MHz	-	395	-	pF
Output Capacitance	C _{oss}		-	106	-	
Reverse Transfer Capacitance	C _{rss}		-	41	-	
Drain-Source Ratings and Characteristics						
Continuous Source Current	I _S	V _G =V _D =0V, Force Current	-	-	-5.2	A
Pulsed Source Current	I _{SM}		-	-	-21	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =-3A, T _J =25°C	-	-	-1.3	V
Reverse Recovery Time	t _{rr}	I _F =-5A, di/dt=100A/us	-	169	-	nS
Reverse Recovery Charge	Q _{rr}		-	60	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%.
3. Essentially independent of operation temperature.

P-Channel Typical Electrical and Thermal Characteristic Curves

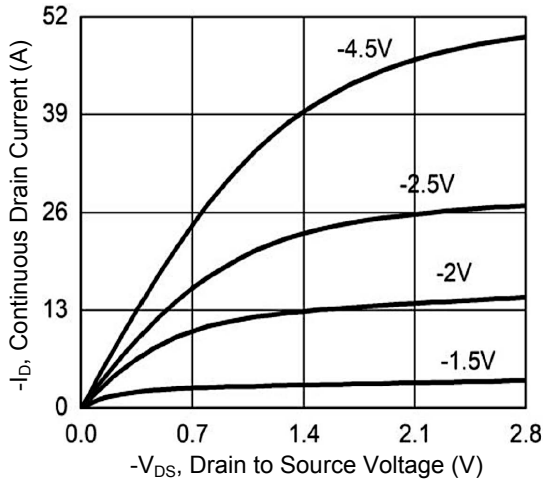


Figure 1. Output Characteristics

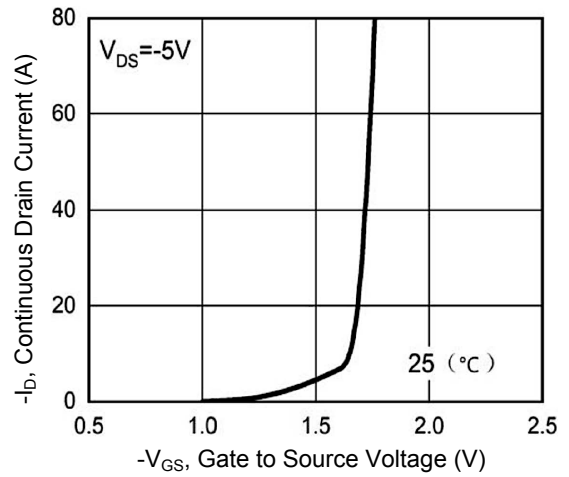


Figure 2. Transfer Characteristics

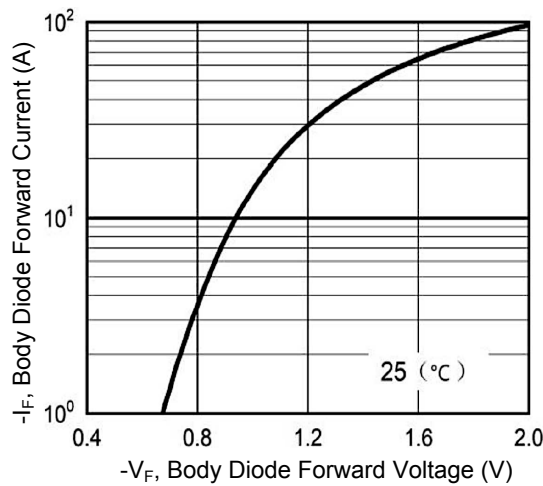


Figure 3. Body Diode Characteristics

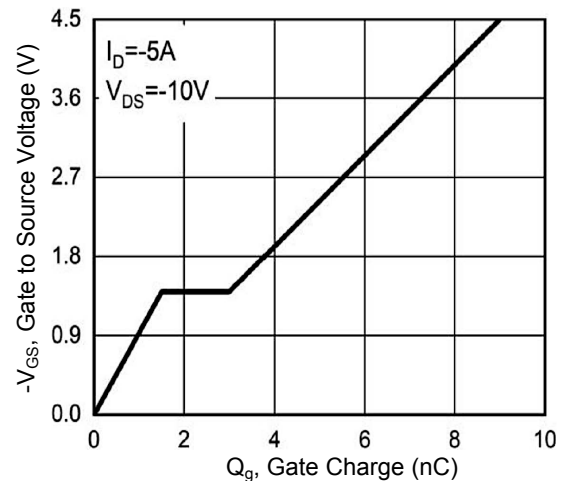


Figure 4. Gate Charge Waveform

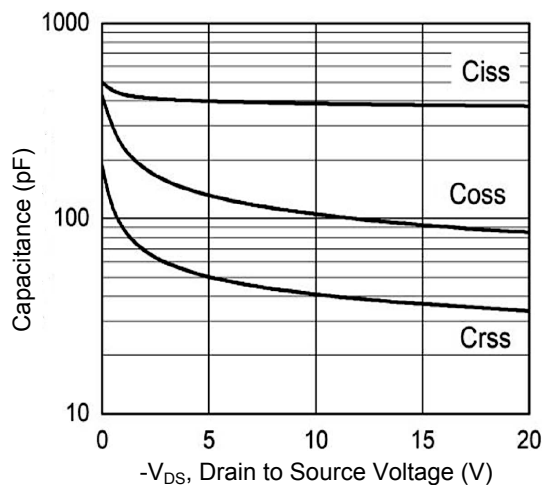


Figure 5. Capacitance Characteristics

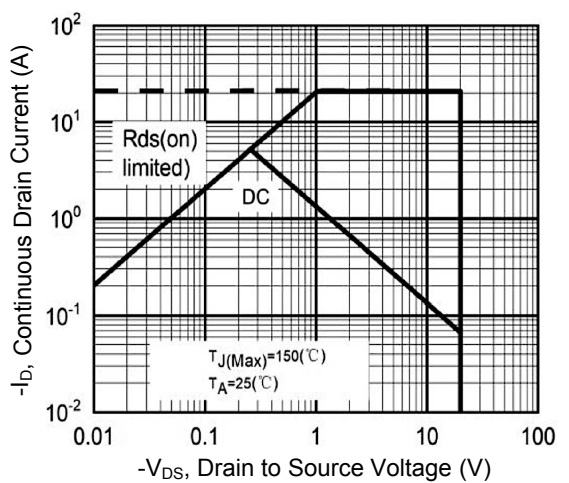
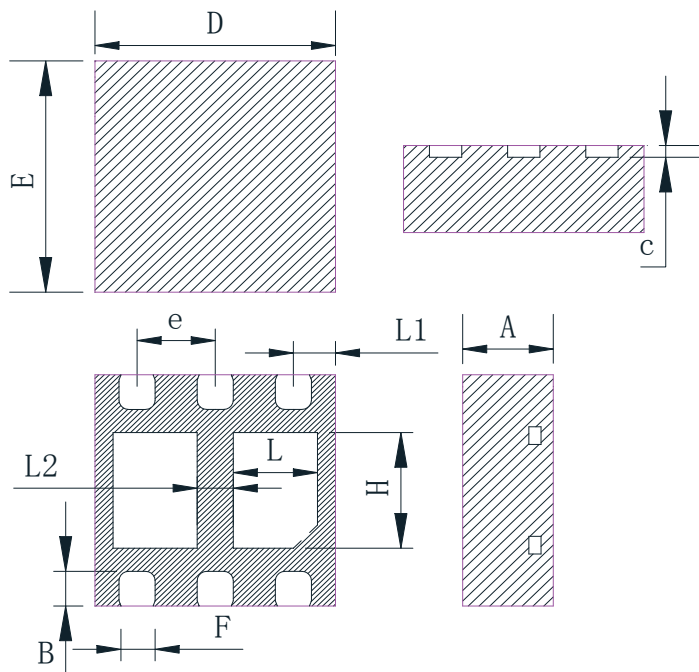


Figure 6. Maximum Safe Operation Area

Package Outline Dimensions (DFN2x2-6L 2EP)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.680	0.800	0.027	0.031
B	0.200	0.400	0.008	0.016
C	0.153	0.253	0.006	0.010
D	1.900	2.100	0.075	0.083
E	1.900	2.100	0.075	0.083
e	0.550	0.700	0.022	0.028
F	0.200	0.400	0.008	0.016
H	0.850	1.100	0.033	0.043
L	0.550	0.800	0.022	0.031
L1	0.250	0.450	0.010	0.018
L2	0.200	0.400	0.008	0.016

Order Information

Device	Package	Marking	Carrier	Quantity
GSFB3916K	DFN2x2-6L 2EP	B396K	Tape & Reel	3,000 Pcs / Reel